Instructions - Parts

Viscon® LT

3A2824B

EN

Fluid Heater

For variable heating of fluids.

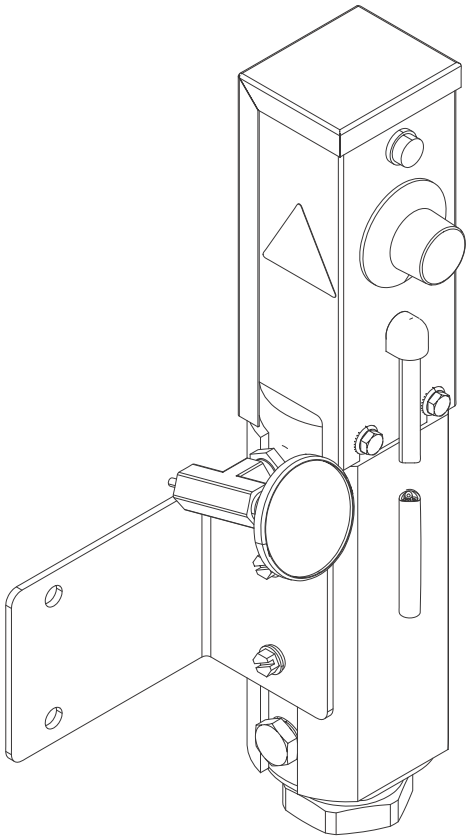
Not approved for use in explosive atmospheres or hazardous locations.

Model No. 16T525

1750 W; 7.3 A; 240VAC; 50/60Hz, 1 Phase

2000 psi (14 MPa, 138 bar) Maximum Working Pressure

Important Safety Instructions
Read all warnings and instructions in this manual.
Save these instructions.



TI19998a

Intertek
9902471
Conforms to
UL Std. 499
CSA Std. 22.2 No. 88

PROVEN QUALITY. LEADING TECHNOLOGY.

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Warnings

The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbols refer to procedure-specific risks. When these symbols appear in the body of this manual or on warning labels, refer back to these Warnings. Product-specific hazard symbols and warnings not covered in this section may appear throughout the body of this manual where applicable.

⚠ WARNING

ELECTRIC SHOCK HAZARD

This equipment must be grounded. Improper grounding, setup, or usage of the system can cause electric shock.

- Turn off and disconnect power cord before servicing equipment.
- Connect only to grounded electrical outlets.
- Use only 3-wire extension cords.
- Ensure ground prongs are intact on power and extension cords.
- Do not expose to rain. Store indoors

BURN HAZARD

Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns:

- Do not touch hot fluid or equipment.

SKIN INJECTION HAZARD

High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. **Get immediate surgical treatment.**

- Do not spray without tip guard and trigger guard installed.
- Engage trigger lock when not spraying.
- Do not point gun at anyone or at any part of the body.
- Do not put your hand over the spray tip.
- Do not stop or deflect leaks with your hand, body, glove, or rag.
- Follow the **Pressure Relief Procedure** when you stop spraying and before cleaning, checking, or servicing equipment.
- Tighten all fluid connections before operating the equipment.
- Check hoses and couplings daily. Replace worn or damaged parts immediately.

FIRE AND EXPLOSION HAZARD

Flammable fumes, such as solvent and paint fumes, in **work area** can ignite or explode. To help prevent fire and explosion:

- Use equipment only in well ventilated area.
- Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc).
- Keep work area free of debris, including solvent, rags and gasoline.
- Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present.
- Ground all equipment in the work area. See **Grounding** instructions.
- Use only grounded hoses.
- Hold gun firmly to side of grounded pail when triggering into pail. Do not use pail liners unless they are antistatic or conductive.
- **Stop operation immediately** if static sparking occurs or you feel a shock**.** Do not use equipment until you identify and correct the problem.
- Keep a working fire extinguisher in the work area.

WARNING

TOXIC FLUID OR FUMES HAZARD

Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.

- Read MSDSs to know the specific hazards of the fluids you are using.
- Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines.

PERSONAL PROTECTIVE EQUIPMENT

Wear appropriate protective equipment when in the work area to help prevent serious injury, including eye injury, hearing loss, inhalation of toxic fumes, and burns. This protective equipment includes but is not limited to:

- Protective eyewear, and hearing protection.
- Respirators, protective clothing, and gloves as recommended by the fluid and solvent manufacturer

EQUIPMENT MISUSE HAZARD

Misuse can cause death or serious injury.

- Do not operate the unit when fatigued or under the influence of drugs or alcohol.
- Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See **Technical Data** in all equipment manuals.
- Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS from distributor or retailer.
- Do not leave the work area while equipment is energized or under pressure.
- Turn off all equipment and follow the **Pressure Relief Procedure** when equipment is not in use.
- Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only.
- Do not alter or modify equipment. Alterations or modifications may void agency approvals and create safety hazards.
- Make sure all equipment is rated and approved for the environment in which you are using it.
- Use equipment only for its intended purpose. Call your distributor for information.
- Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces.
- Do not kink or over bend hoses or use hoses to pull equipment.
- Keep children and animals away from work area.
- Comply with all applicable safety regulations.

PRESSURIZED ALUMINUM PARTS HAZARD

Use of fluids that are incompatible with aluminum in pressurized equipment can cause serious chemical reaction and equipment rupture. Failure to follow this warning can result in death, serious injury, or property damage.

- Do not use 1,1,1-trichloroethane, methylene chloride, other halogenated hydrocarbon solvents or fluids containing such solvents.
- Many other fluids may contain chemicals that can react with aluminum. Contact your material supplier for compatibility.

THERMAL EXPANSION HAZARD

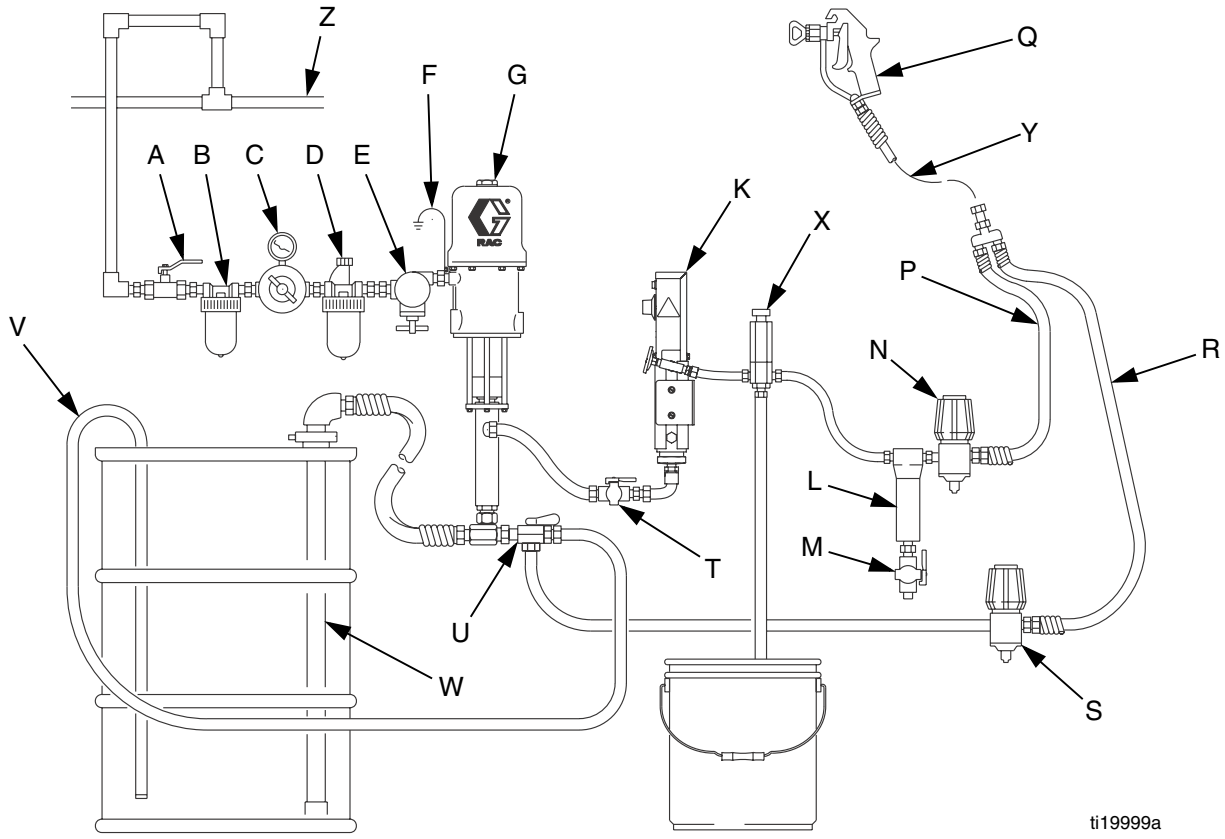
Fluids subjected to heat in confined spaces, including hoses, can create a rapid rise in pressure due to the thermal expansion. Over-pressurization can result in equipment rupture and serious injury.

- Open a valve to relieve the fluid expansion during heating.
- Replace hoses proactively at regular intervals based on your operating conditions.

Installation

Typical Installation Drawing

The typical installation drawing is only a guide. Your Graco distributor can assist in designing your system.

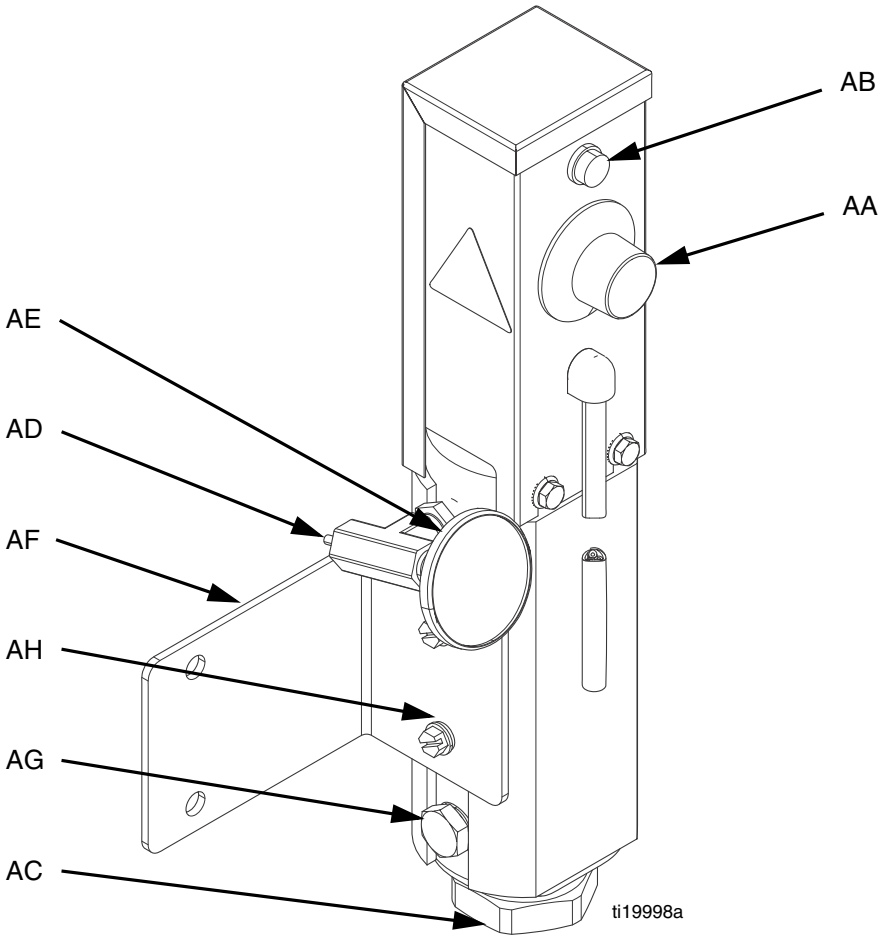


Key:

A	Bleed-type Master Air Valve	L	Fluid Filter	U	Director Valve
B	Air Filter	M	Drain Valve	V	Drain Back Tube
C	Air Regulator and Gauge	N	Fluid Pressure Regulator	W	Suction Tube
D	Air Line Lubricator	P	Fluid Supply Line	X	Pressure Relief Valve
E	Pump Runaway Valve	Q	Spray Gun	Y	Whip End Hose
F	Ground Wire	R	Fluid Return Line	Z	Air Supply Line
G	Pump	S	Back Pressure Valve		
K	Heater	T	Fluid Shutoff Valve		

FIG. 1: Typical Installation – Heated Circulating System

Component Identification



Key:

AA Temperature control
AB Heater light (illuminated while heating)
AC Heater inlet, 3/8 npt(f)
AD Heater outlet, 1/4 npt(f)
AE Outlet thermometer
AF Mounting bracket
AG Heater plug
AH Insulating washers

FIG. 2: Typical Installation – Heated Circulating System

General Information

- Select system components that meet temperature and pressure ratings listed in **Technical Data**, page 20. The heater's normal output range is adjustable from 84-180°F (29-82°C).
- To prevent fire and explosion, locate heater away from all flammable materials and where operators will not come in contact with hot metal surfaces.
- To avoid burns, insulate and/or label lines and components exiting heater that may become hot.

Selecting Tubing

Fluid loses some heat through the tubing or hose between the heater and spray gun. Locate heater close to the spray area to minimize heat loss through plumbing.

The chart in FIG. 3 shows a heat loss curve for 3 common types of tubing.

Chart Notes:

- Higher flow rates have less heat loss.
- Foam-insulated steel tubing and high pressure airless paint hose retain heat best. Insulated tubing and hose are more expensive, but higher costs are commonly offset by lower operating costs.

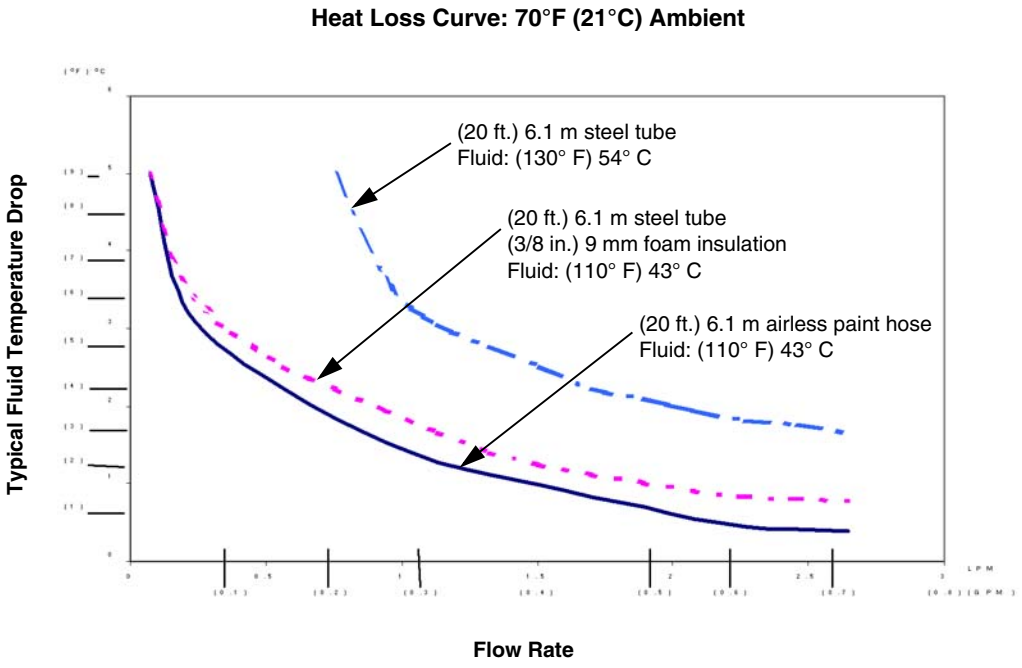

Heat Loss Curve: 70°F (21°C) Ambient
Typical Fluid Temperature Drop
(20 ft.) 6.1 m steel tube
Fluid: (130° F) 54° C
(20 ft.) 6.1 m steel tube
(3/8 in.) 9 mm foam insulation
Fluid: (110° F) 43° C
(20 ft.) 6.1 m airless paint hose
Fluid: (110° F) 43° C
Flow Rate

FIG. 3: Typical Temperature Drop

Mounting Heater

Heater controls must be easily accessible.

The mounting surface must be able to support the weight of the heater and fluid, and any stress caused during operation.

Wall Mounting

Use included wall bracket 16R988 and insulating washers (29), part number 167002, quantity 2. See FIG. 4.

Use wall bracket as a template to mark bolt holes.

Bracket 16R988

(FIG. 4)

1. Use 1/4 in. bolts of appropriate length and lock-washer (CC), not supplied, to mount bracket.
2. Use two screws (32) and washers (31) to install heater onto bracket.

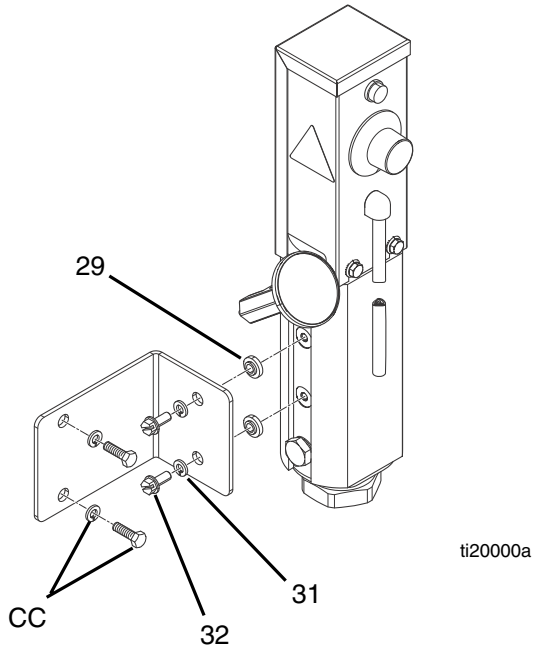
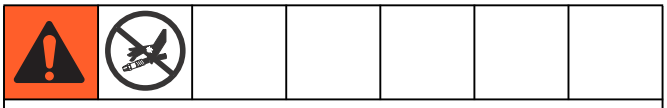


FIG. 4:

Fluid Connections and Accessories



To prevent serious injury caused by component or equipment rupture:

- Never install a shutoff device between the heater and gun as this will trap the heated fluid and not allow for expansion.
- Never use a fluid regulator as a shutoff device if it is installed between the heater and gun
- Provide a means for adequately handling fluid expansion caused by heat.

To handle fluid expansion caused by heat:

- Use flexible hoses between heater and gun.
- Install a properly sized accumulator down-stream from the heater.
- Install a pressure relief valve (X) pre-set to relieve pressure when it exceeds the system maximum working pressure.

Electrical Connections

This equipment must be grounded. All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

NOTICE

To help prevent heater damage, avoid spilling liquids onto electrical components.

Requirements For All Installations

- The user must provide external over-current protection. For installations in the United States and Canada, a branch circuit breaker must be used for over-current protection. The maximum recommended circuit breaker size is 15 amps.

Power Cable Connections

The heater power cable uses a 3 conductor cable and a NEMA L6-20P twist lock connector. If another connector is used, follow the table below for correct wiring.

Cable Color Code	Function
Black or Brown	Line (Mains)
White or Blue	Neutral
Green or Green/Yellow	Protective Ground/Earth

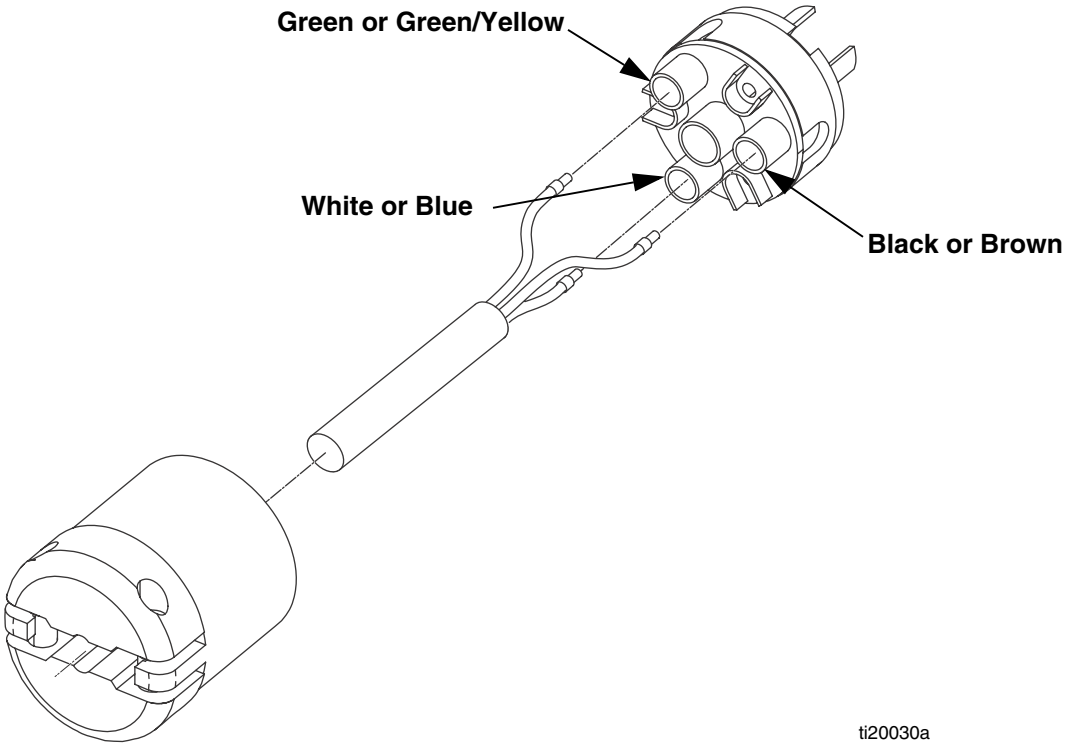


FIG. 5: Connector

Operation

Pressure Relief Procedure

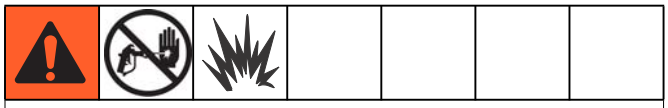
Follow the Pressure Relief Procedure whenever you see this symbol.

This equipment stays pressurized until pressure is manually relieved. To help prevent serious injury from pressurized fluid, such as skin injection, splashing fluid and moving parts, follow the Pressure Relief Procedure when you stop spraying and before cleaning, checking, or servicing the equipment.

Follow **Pressure Relief Procedure** when you stop spraying, and before cleaning, checking, or servicing equipment.

1. Engage the gun trigger lock.
2. Shut off main power to the heater.
3. Circulate fluid for at least 10 minutes to cool the heated fluid and heater.
4. Shut off all air and fluid supplies.
5. Disengage the gun trigger lock.
6. Hold a metal part of the gun firmly to a grounded metal pail, and trigger the gun to relieve pressure.
7. Engage the gun trigger lock.

Initial Flushing



To avoid skin injection, do not point gun at anyone or at any part of the body. To avoid fire and explosion, ensure main power is off and heater is cool before flushing. Do not turn on heater until fluid lines are clear of solvent.

The heater was tested with lightweight oil, which needs to be flushed out before using the equipment. Use a compatible solvent, and follow flushing instructions in your fluid supply and spray gun manual.

Priming System

(Refer to FIG. 1, page 5)

1. Do not turn on the heater yet.
2. If using an airless spray gun, do not install a spray tip yet.
3. Start the pump according to the instructions supplied with it.
4. Turn the system director valve (U) to circulate, and circulate fluid for several minutes.
5. Open the spray gun (Q) at the last outlet to prime the line. Repeat for all gun stations.
6. Engage the gun trigger lock.
7. Shut off the air supply to the pump.
8. Perform **Pressure Relief Procedure**.
9. Install the gun spray tip.

Setting Heater Control

(Refer to FIG. 6)

1. Set the heater control knob (9) to a trial setpoint of 4 or 5.
2. Start the pump and circulate fluid through the system at a very low flow rate of about 10-12 oz/min (0.30-0.35 liter/min).
3. After the red heater light (AB) turns off, read the temperature on the thermometer (38). If it does not match the desired temperature, adjust the setpoint.

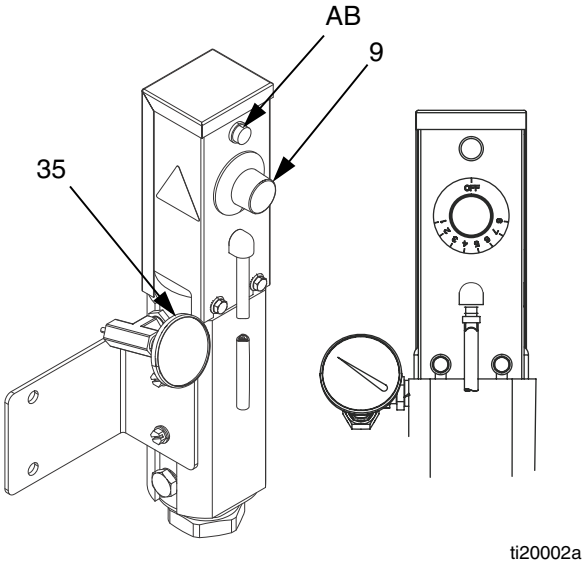


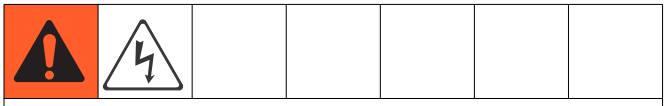
FIG. 6: Setting Heater Control

Troubleshooting

PROBLEM	CAUSE	SOLUTION
No heat and heater indicator light is off.	Heater power off or circuit breaker tripped.	Turn heater power on or reset circuit breaker.
	Bad thermostat (17).	With power on, check for continuity on/off at clicks when turning the heater control knob. To replace thermostat, see page 16.
	Bad overtemperature sensor (19). This is a high temperature limit fuse and must be replaced if blown.	With power on, check for continuity at overtemperature sensor. To replace sensor, see page 15.
No heat but heater indicator light is on.	Bad heater cartridge (20).	With power OFF, check for continuity at heater cartridge connections which should be 29-36 ohms.
Heat but heater indicator light is off.	Bad light.	Check connections. Replace lamp.

Repair

Before Beginning Repair



Repairing this equipment requires access to parts which may cause electric shock or other serious injury if work is not performed properly. Have a qualified electrician connect power and ground to main power switch terminals. Be sure to shut off all power to the equipment before repairing.

1. Flush if necessary.

2. Shut off all power to equipment.

3. Perform **Pressure Relief Procedure**, page 11.

Heater Temperature Controls

See FIG. 7. Control knob (9) sets temperature of heater. Indicator light (8) turns on when thermostat is heating and off when heater reaches setpoint.

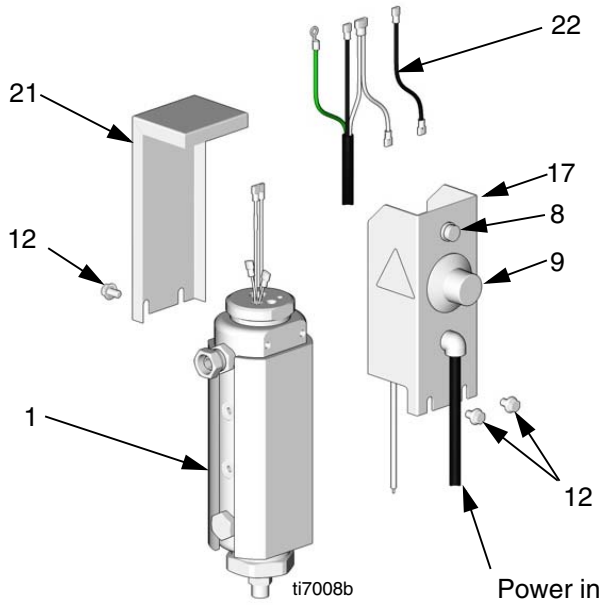


FIG. 7

Heater Cartridge

1. See **Before Beginning Repair**, page 14. Relieve pressure.
2. Wait for heaters to cool.
3. **Testing**: Use a multimeter to check resistance across cartridge leads per the **Technical Data** chart. Also check that neither lead has continuity to the cartridge case.
4. See FIG. 7 and **Parts** illustration on page 18. Loosen all four screws (12) from bracket (16) and shield (21). Pull bracket assembly away from heater housing (1) to remove heater cartridge (20) from core. If necessary, plug (4) can be removed from the bottom of core (2) so that cartridge can be pushed out from underneath.
5. Disconnect heater cartridge from jumper wires (22, CC) and heater thermostat switch (17, HH). See FIG. 8.
6. Connect new heater cartridge to jumper wire (CC) and thermostat heater switch (H), then reassemble heater in reverse order of disassembly.

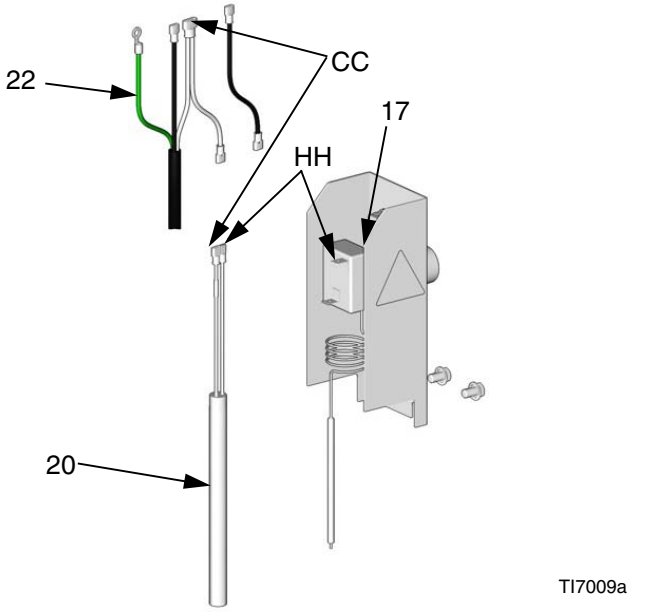


FIG. 8

Thermal Limit Sensor

1. See **Before Beginning Repair**, page 14. Relieve pressure.
2. Wait for heaters to cool.
3. **Testing**: Check that you have continuity across the two leads. If circuit is open, replace thermal limit sensor (19). See FIG. 9
4. See FIG. 7. Loosen all four screws (12) from bracket (16) and shield (21). Pull bracket assembly away from heater housing (1). To remove thermal limit sensor (19) from core (2) pull upward with a steady force.
5. Disconnect thermal limit sensor from jumper wire (23, BB) and heater thermostat switch (17, GG). See FIG. 9.
6. Connect new thermal limit sensor to jumper wire (BB) and thermostat switch (GG), then reassemble heater in reverse order of disassembly.

NOTE: Apply a thin film of heat sink compound 110009 to thermal limit sensor (19).

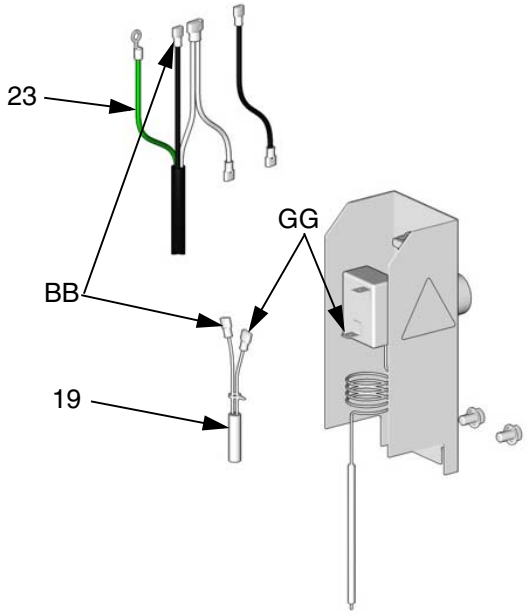


FIG. 9

Indicator Light

1. See **Before Beginning Repair**, page 14. Relieve pressure.
2. Wait for heaters to cool.
3. See FIG. 7. Loosen two screws (12) and remove shield (21).
4. Disconnect jumper wires (23, DD, EE) from back of indicator light (9), then push light out through the front face of the control bracket (17) by depressing the prongs on the sides of the light. See FIG. 10.
5. Press new light into control bracket (16) until prongs lock in place.
6. Connect jumper wires (DD, EE) and reassemble heater in reverse order of disassembly.

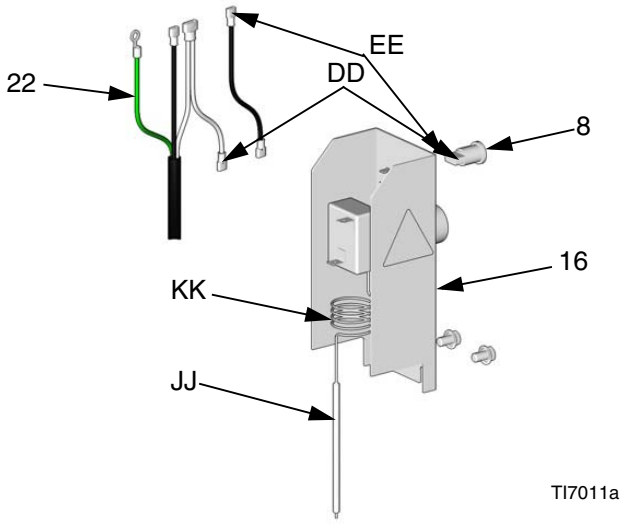


FIG. 10

Heater Thermostat Switch

1. See **Before Beginning Repair**, page 14. Relieve pressure.
2. Wait for heaters to cool.
3. **Testing**: See FIG. 10. With thermostat probe (JJ) above 75°F (24°C), and below 160°F (71°C), the continuity across the contacts should open when turned off, and close when turned up toward 8. You should hear the switch click open and closed.
4. See FIG. 7. Loosen two screws (12) and remove shield (20).
5. See FIG. 11. Detach the two push on connectors from thermostat switch (17). One is from thermal limit sensor (19) at GG, and dual connector HH and FF is from heater cartridge (21) and light (8).

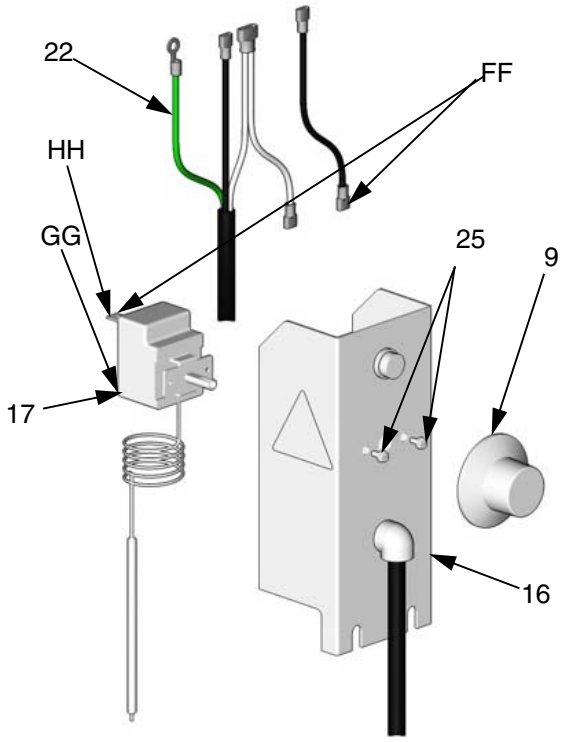


FIG. 11

6. Pull heater control knob (9) off of heater control bracket (16) face.
7. Using a phillips head screwdriver, remove screws (25) on control bracket face to release ther-

mostat switch from bracket. Pull thermostat probe (JJ) slowly out of heater core (2).

8. Insert new thermostat probe into core with heat sink compound 110009. Use screws (25) to install new thermostat switch behind bracket face and install control knob.

9. Reattach jumper wires (22) and reassemble heater in reverse order of disassembly.

   - Stretch thermostat probe coils (KK) down to contact top of core. Route wires from thermal limit switch (19), heater cartridge (20), and ground wire through center of coils.
   - Bend tabs on thermostat away from each other after installing wire connectors so they do not interfere with shield (21).

Cleaning Heater Core

1. See **Before Beginning Repair**, page 14. Relieve pressure.

2. Wait for heaters to cool.

3. Loosen four screws (12) then pull control section up out of the way.

4. See FIG. 12. Unscrew core (2) from housing (1). Use wire brush to clean core then re-install in housing.

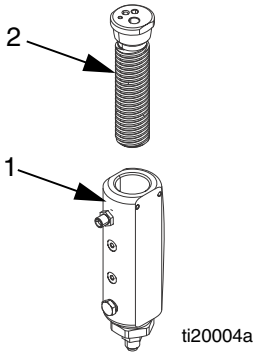
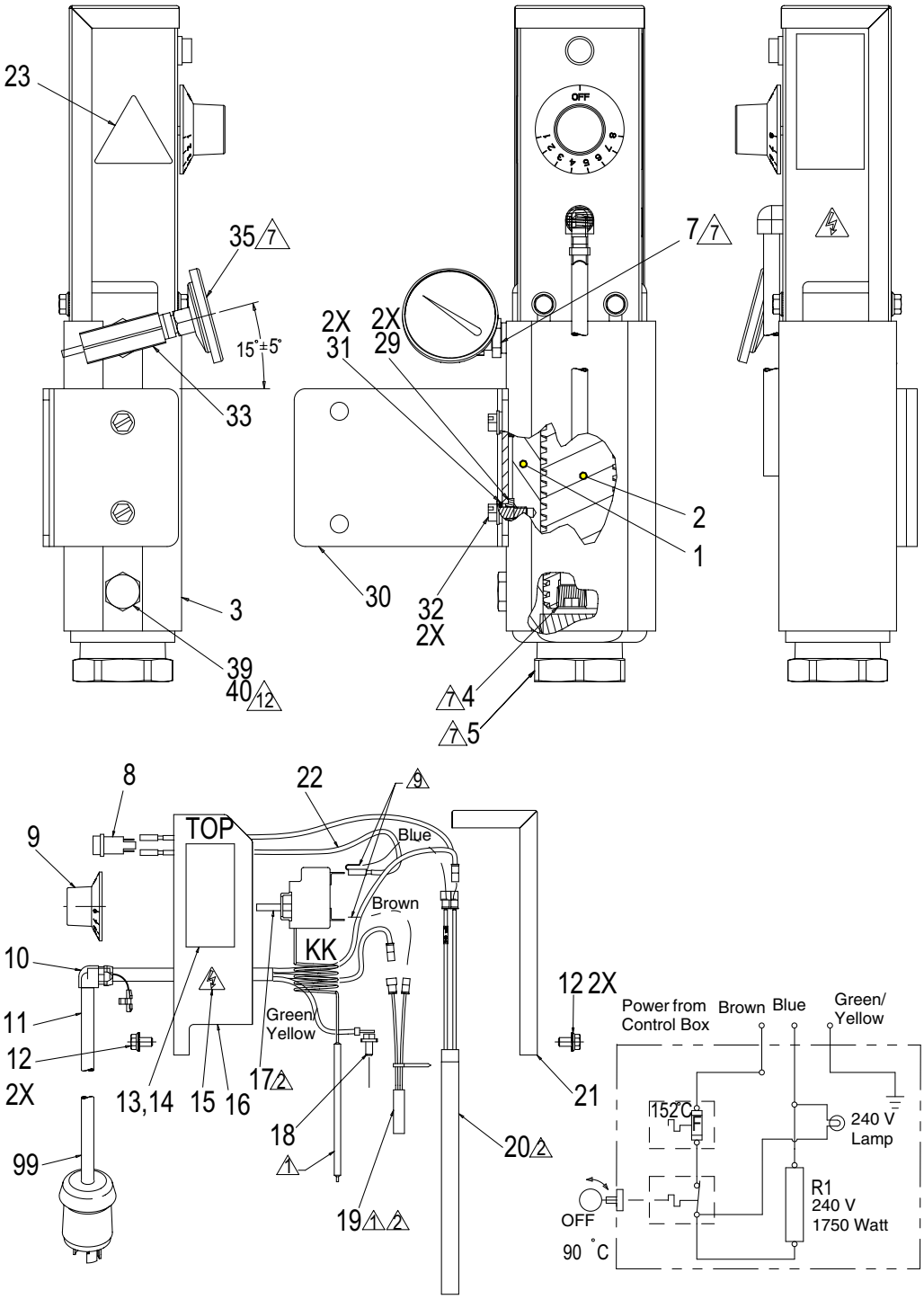


FIG. 12

Parts



1 Apply a thin film of heatsink compound (26).

2 Stretch capillary coils (KK) down to contact top of core (2). Route wires from thermal limit switch (19), heater cartridge (20) and ground wire through center of coils.

7 Apply both tape (27) and sealant (28) to all pipe threads.

9 Bend tabs on thermostat away from each other after installing wire connectors so cover cannot contact wires.

12 Apply lubricant to o-ring (40).

Ref	Part	Description	Qty
1	24K987	HOUSING, heater	1
2	24K988	CORE, heater, spiral	1
3	24K992	INSULATOR, heater	1
4	101754	PLUG, pipe	1
5	24K991	BUSHING, reducing, 1-1/5 x 3/8	1
7	166863	FITTING, nipple, reducing	1
8	114286	LIGHT, indicator, 240V	1
9	24K979	KNOB, control, heater	1
10	119924	BUSHING, strain relief, 90 degree	1
11	16T187	HARNESS, power, heater	1
12	---	SCREW, machine, hex serrated	4
13	---	LABEL, identification	1
15▲	189930	LABEL, electric shock, triangular	1
16	249521	BRACKET, heater control	1
17	24K978	SWITCH, thermostat, heater	1
18	116343	SCREW, ground	1
19	24K980	SENSOR, thermal limit, 152C, QD	1
20	16T173	CARTRIDGE, heater, 1750W, 240V	1
21	249520	SHIELD, heater control	1
22	119858	WIRE, jumper, heater	1
23▲	189285	LABEL, burn hazard, triangular	1
24	172953	LABEL, designation	1
25	195874	SCREW, machine, phillips pan head	2
26	110009	LUBRICANT, thermal, 1 oz tube	1
29	167002	INSULATOR, heat	2
30	16R989	BRACKET, heater	1
31	100016	WASHER, lock	2
32	108296	SCREW, machine, hex washer head	2
33	113914	FITTING, tee, 1/4 npt, female	1
35	102124	THERMOMETER, dial	1
39	198241	PLUG, port, pressure	1
40	111457	O-RING	1
99	16T174	PLUG, electrical, locking, L6-20P	1

--- *Not for sale.*

▲ *Replacement Danger and Warning labels, tags and cards are available at no cost.*

◆ *Not shown.*

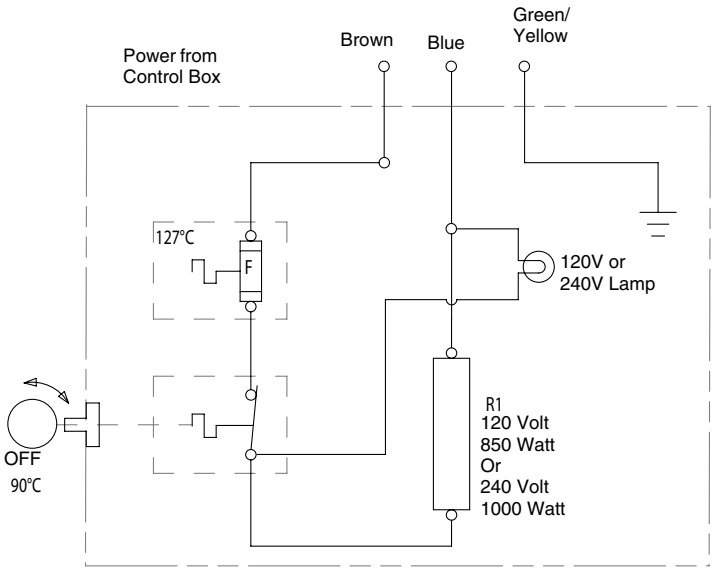
Accessories

110009 Heat sink compound, 1 oz. tube

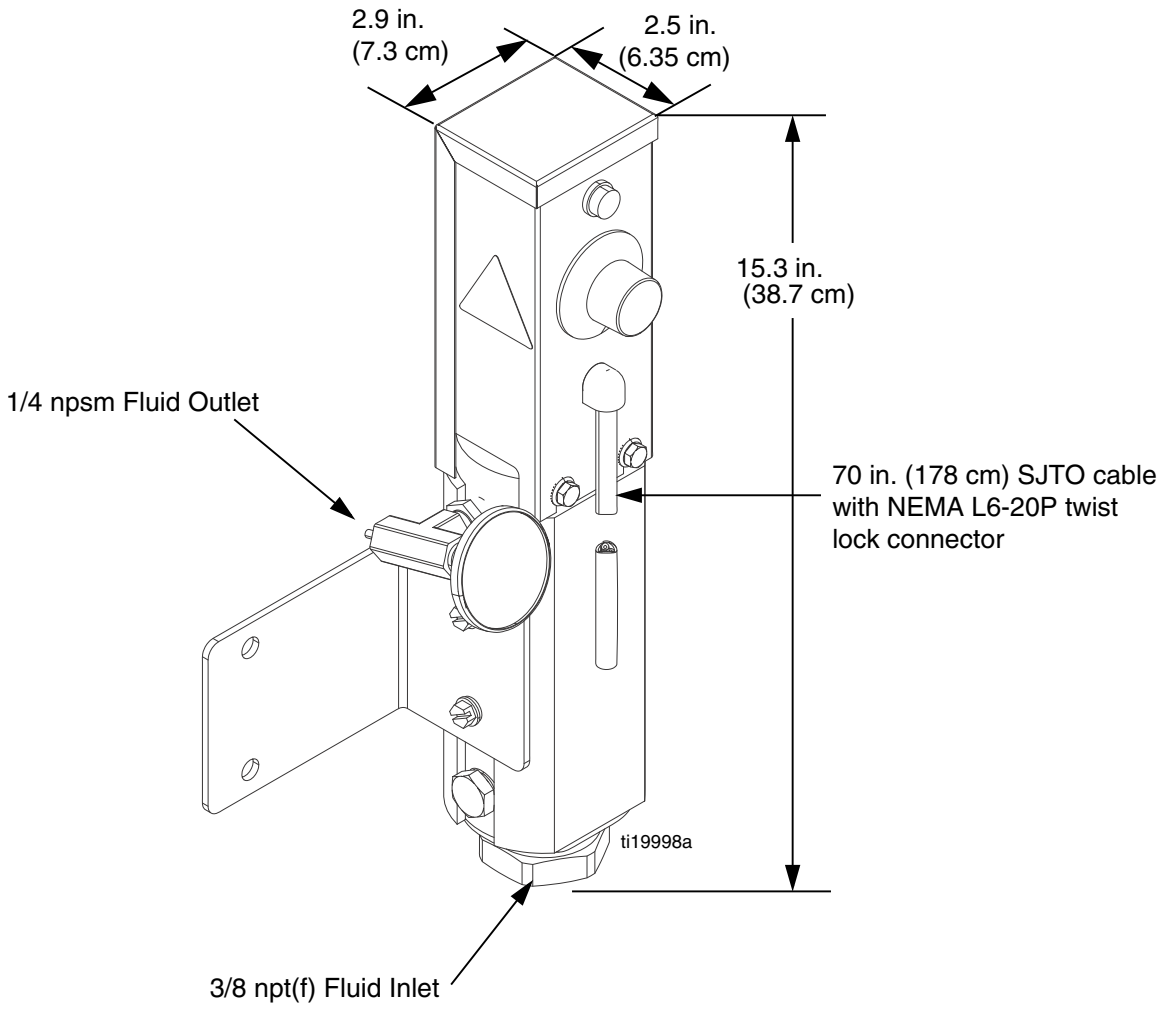
Technical Data

Maximum Working Pressure	2000 psi (140 bar, 14 MPa)
Maximum Amps	7.3 A
Maximum Fluid Temperature	180°F (82°C)
Voltage	240 VAC, 1750 Watts
Heater Resistance	29 to 36 ohms
Heated Core Area	68 $in.^2$ (438 $cm^{2)}$
Fluid Path	3 parallel paths, 40 in. each
Pressure Drop	Equivalent to 40 in. of 1/4 in. (6.3 mm) ID hose
Inlet	3/8 npt(f)
Outlet	1/4 npt(f)
Weight	9.0 lb (4.1 kg)
Wetted Parts	Anodized aluminum, zinc-plated steel, stainless steel, PTFE

Schematic Diagram



Dimensions


2.9 in.
(7.3 cm)
2.5 in.
(6.35 cm)
15.3 in.
(38.7 cm)
1/4 npsm Fluid Outlet
70 in. (178 cm) SJTO cable
with NEMA L6-20P twist
lock connector
ti19998a
3/8 npt(f) Fluid Inlet

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

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For the latest information about Graco products, visit www.graco.com.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.
Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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For patent information, see www.graco.com/patents.

Original instructions. This manual contains English. MM 3A2824

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